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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

09/841,088

Applicant(s)

HOOVER ET AL.

Examiner

Qing Chen

Art Unit

2191

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 April 2001.
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-72 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) 1-72 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☒ The drawing(s) filed on 24 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20010424
4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____

DETAILED ACTION

1. This is the initial Office action based on the application filed on April 24, 2001.
2. **Claims 1-72** are pending.

Claim Objections

3. **Claims 14-22, 39-47, 50, and 64-72** are objected to because of the following informalities:

- **Claims 14, 39, 50, and 64** recite the limitation “the one or more data structures.”

Applicant is advised to change this limitation to read “the plurality of data structures” for the purpose of keeping the claim language consistent throughout the claims.

- **Claims 15-22** depend on Claim 14 and, therefore, suffer the same deficiency as Claim 14.

- **Claims 40-47** depend on Claim 39 and, therefore, suffer the same deficiency as Claim 39.

- **Claims 65-72** depend on Claim 64 and, therefore, suffer the same deficiency as Claim 64.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. **Claims 7, 8, 22, 24, 25, 32, 33, 47, 57, 58, and 72** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 7, 32, and 57 recite the limitation “said data.” There is insufficient antecedent basis for this limitation in the claims. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “said thread data” for the purpose of further examination.

Claim 8 depends on Claim 7 and, therefore, suffers the same deficiency as Claim 7.

Claim 33 depends on Claim 32 and, therefore, suffers the same deficiency as Claim 32.

Claim 58 depends on Claim 57 and, therefore, suffers the same deficiency as Claim 57.

Claims 22, 47, and 72 recite the limitation “the one or more functions.” There is insufficient antecedent basis for this limitation in the claims. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “one or more functions” for the purpose of further examination.

Claims 24 and 25 recite the category of invention “[t]he data construct.” The category of invention of the independent claim is directed to a memory, not a data construct. In the interest of compact prosecution, the Examiner subsequently interprets this limitation as reading “[t]he memory” for the purpose of further examination.

Claim Rejections - 35 USC § 101

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. **Claims 23-50** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 23-25 appear to be directed to a compilation or mere arrangement of data. The recited components of the data construct do not adhere to the definition of a “data structure,” which defines “a physical or logical relationship among data elements, designed to support specific data manipulation functions.” (The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) The claims are directed to nonfunctional descriptive material *per se*, and hence non-statutory. Furthermore, when nonfunctional descriptive material is recorded on some computer-readable medium, in a computer or on an electromagnetic carrier signal, it is not statutory since no requisite functionality is present to satisfy the practical application requirement. Merely claiming nonfunctional descriptive material, *i.e.*, abstract ideas, stored on a computer-readable medium, in a computer, or on an electromagnetic carrier signal, does not make it statutory. See *Diamond v. Diehr*, 450 U.S. 175, 185-86, 209 USPQ 1, 8.

Claims 26-47 contain “means-plus-function” limitations and appear to be systems. However, it is noted that the specification does not disclose any specific corresponding structure

or equivalents thereof. The recited means appear to lack the necessary physical components (hardware) to constitute a machine or manufacture under § 101. Therefore, these claim limitations can be reasonably interpreted as computer program modules—software *per se*. The claims are directed to functional descriptive material *per se*, and hence non-statutory.

Claims 48-50 are directed to systems. However, the recited components of the systems appear to lack the necessary physical components (hardware) to constitute a machine or manufacture under § 101. Therefore, these claim limitations can be reasonably interpreted as computer program modules—software *per se*. The claims are directed to functional descriptive material *per se*, and hence non-statutory.

The claims constitute computer programs representing computer listings *per se*. Such descriptions or expressions of the programs are not physical “things.” They are neither computer components nor statutory processes, as they are not “acts” being performed. Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program’s functionality to be realized. In contrast, a claimed computer-readable medium encoded with a computer program is a computer element, which defines structural and functional interrelationships between the computer program and the rest of the computer, that permits the computer program’s functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. **Claims 1, 7, 8, 10-12, 14-17, 20, 22, 26, 32, 33, 35-37, 39-42, 45, 47-51, 57, 58, 60-62, 64-67, 70, and 72** are rejected under 35 U.S.C. 102(e) as being anticipated by US 6,611,276 (hereinafter “Muratori”).

As per **Claim 1**, Muratori discloses:

- selecting a display mode for displaying thread data of one or more threads of at least one application, said display mode comprising one of a function-centric display mode and a thread-centric display mode (*see Column 4: 16-20, “When executed, computer instructions 48 generate a GUI (for display on display screen 50) which allows a programmer to view results of the simulations and to debug computer code in threads 40.” and 25-28, “Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54.” and 42-45, “All threads that execute in the microengines may be displayed, or any subset thereof may be displayed. A user can select which threads are displayed.”*); and

- displaying said thread data based on the selected display mode (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54."*).

As per **Claim 7**, the rejection of **Claim 1** is incorporated; and Muratori further discloses:

- wherein said thread data includes performance data of said one or more threads (*see Column 5: 41-47, "Pointing (without clicking) a mouse (or other input device) to a state indicator causes information to be displayed to the user. For example, as shown in FIG. 5, pointing to point 92 on state indicator 94 displays information 96. Information 96 identifies the cycle at point 94 of thread 58c ("Cycle=4694") and the instruction of thread 58c executing at that point ("PC=193")."*).

As per **Claim 8**, the rejection of **Claim 7** is incorporated; and Muratori further discloses:

- wherein said performance data comprises profile data of said one or more threads (*see Column 5: 41-47, "Pointing (without clicking) a mouse (or other input device) to a state indicator causes information to be displayed to the user. For example, as shown in FIG. 5, pointing to point 92 on state indicator 94 displays information 96. Information 96 identifies the cycle at point 94 of thread 58c ("Cycle=4694") and the instruction of thread 58c executing at that point ("PC=193")."*).

As per **Claim 10**, the rejection of **Claim 1** is incorporated; and Muratori further discloses:

- wherein said selected display mode is the thread-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing one or more functions of the at least one application (*see Column 4: 46-49, "GUI 52 also includes state indicators 70. State indicators 70 are horizontal (linear) bars which reflect states of execution of the threads (and the microengines) as functions of time."*; *Column 5: 22-25, "Using the state indicators, a programmer can attempt to optimize code in the threads. For example, the programmer can change code in the threads to reduce microengine idle time and thus obtain more efficient code."*).

As per **Claim 11**, Muratori discloses:

- selecting a display mode from a plurality of display modes for displaying performance data of one or more threads of an application, said plurality of display modes comprising a thread-centric display mode focused on an individual thread's activity (*see Column 4: 16-20, "When executed, computer instructions 48 generate a GUI (for display on display screen 50) which allows a programmer to view results of the simulations and to debug computer code in threads 40."* and 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54." and 42-45, "All threads that execute in the microengines may be displayed, or any subset thereof may be displayed. A user can select which threads are displayed."); and

- displaying said performance data of said one or more threads based on the selected display mode (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by*

computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54.”).

As per **Claim 12**, the rejection of **Claim 11** is incorporated; and Muratori further discloses:

- wherein said thread-centric display mode includes an indication of at least one of: the threads created at runtime, one or more functions executed by a thread, and an amount of system resources consumed by a thread in each function executed by the thread (*see Column 4: 46-49, “GUI 52 also includes state indicators 70. State indicators 70 are horizontal (linear) bars which reflect states of execution of the threads (and the microengines) as functions of time.”; Column 5: 22-25, “Using the state indicators, a programmer can attempt to optimize code in the threads. For example, the programmer can change code in the threads to reduce microengine idle time and thus obtain more efficient code.”).*

As per **Claim 14**, Muratori discloses:

- creating a plurality of data structures to be used in displaying performance data of at least one application, wherein at least one data structure of the plurality of data structures has associated therewith performance data of at least one thread of the at least one application (*see Column 4: 8-12, “Also stored in memory 38 are an operating system 46, such as Windows98®, and computer instructions 48 for simulating processor 10, including the operation of threads 40 in microengines 14.” and 16-20, “When executed, computer instructions 48 generate a GUI (for display on display screen 50) which allows a programmer to view results of the simulations and*

to debug computer code in threads 40.” and 25-28, “Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54.” and 42-45, “All threads that execute in the microengines may be displayed, or any subset thereof may be displayed. A user can select which threads are displayed.”); and

- presenting the plurality of data structures in an organizational structure, wherein the organizational structure is based on at least one of functional activities within the at least one application and thread activities within the at least one application (*see Column 4: 25-28, “Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54.”*).

As per **Claim 15**, the rejection of **Claim 14** is incorporated; and Muratori further discloses:

- wherein said performance data of said at least one thread comprises profile data of said at least one thread (*see Column 5: 41-47, “Pointing (without clicking) a mouse (or other input device) to a state indicator causes information to be displayed to the user. For example, as shown in FIG. 5, pointing to point 92 on state indicator 94 displays information 96. Information 96 identifies the cycle at point 94 of thread 58c (“Cycle=4694”) and the instruction of thread 58c executing at that point (“PC=193”).”*).

As per **Claim 16**, the rejection of **Claim 14** is incorporated; and Muratori further discloses:

- wherein said plurality of data structures comprises at least one of a process object, a file object, a function object and a thread object (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54."*).

As per **Claim 17**, the rejection of **Claim 14** is incorporated; and Muratori further discloses:

- wherein the creating is based upon whether the organizational structure is based on functional activities or thread activities (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54."*).

As per **Claim 20**, the rejection of **Claim 14** is incorporated; and Muratori further discloses:

- accumulating performance data for one or more data structures of the plurality of data structures, and wherein said presenting comprises displaying the accumulated performance data with its corresponding data structure (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54."*).

As per **Claim 22**, the rejection of **Claim 14** is incorporated; and Muratori further discloses:

- wherein the organization structure is based on thread activities, and wherein the presenting comprises displaying one or more threads of said at least one application, and for each thread of said one or more threads, displaying its associated performance data, which reflects performance data of one or more functions executed by that thread (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54."*; *Column 6: 9-22, "Reference events are operations performed between threads and devices within/interfaced to processor 10, such as Fbus interface unit 16, SRAM 26, SDRAM 24, and SRAM controller 22 (FIG. 1). For example, reference events may comprise operations performed by a thread to retrieve data from SRAM 26."*).

As per **Claim 23**, Muratori discloses:

- a data construct usable in data visualization (*see Figure 2: 38*), said data construct comprising:

- one or more process objects representing one or more executable entities (*see Column 4: 16-20, "When executed, computer instructions 48 generate a GUI (for display on display screen 50) which allows a programmer to view results of the simulations and to debug computer code in threads 40."*); and

- one or more thread objects associated with at least one process object of said one or more process objects, said one or more thread objects including performance data representing runtime thread activity (*see Column 4: 25-28, "Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code*

in threads 40 identified in display area 54.”; Column 5: 41-47, “Pointing (without clicking) a mouse (or other input device) to a state indicator causes information to be displayed to the user. For example, as shown in FIG. 5, pointing to point 92 on state indicator 94 displays information 96. Information 96 identifies the cycle at point 94 of thread 58c (“Cycle=4694”) and the instruction of thread 58c executing at that point (“PC=193”).”).

Claims 26, 32, 33, 35-37, 39-42, 45, and 47 are system claims corresponding to the method claims above (Claims 1, 7, 8, 10-12, 14-17, 20, and 22) and, therefore, are rejected for the same reasons set forth in the rejections of Claims 1, 7, 8, 10-12, 14-17, 20, and 22.

Claims 48-50 are system claims corresponding to the method claims above (Claims 1, 11, and 14) and, therefore, are rejected for the same reasons set forth in the rejections of Claims 1, 11, and 14.

Claims 51, 57, 58, 60-62, 64-67, 70, and 72 are program storage device claims corresponding to the method claims above (Claims 1, 7, 8, 10-12, 14-17, 20, and 22) and, therefore, are rejected for the same reasons set forth in the rejections of Claims 1, 7, 8, 10-12, 14-17, 20, and 22.

Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. **Claims 2, 27, and 52** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Muratori** in view of US 6,016,474 (hereinafter “**Kim**”) and US 6,539,390 (hereinafter “**Kiczales**”).

As per **Claim 2**, the rejection of **Claim 1** is incorporated; however, Muratori does not disclose:

- wherein said selecting further comprises dynamically switching, by a user, between said function-centric display mode and said thread-centric display mode.

Kim discloses:

- function-centric display mode (*see Column 9: 12-17, “FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right.”*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include function-centric display mode. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

Kiczales discloses:

- wherein said selecting further comprises dynamically switching, by a user, between display modes (*see Column 6: 14-20, “In a present embodiment of the invention, a single display*

mode is provided in which only a single window is displayed, where a user may switch between the object window 310 and the aspect window 320 using a display switcher 317. In addition, a dual display mode is provided in which both the object window 220 and the aspect window 320 are displayed simultaneously. ").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kiczales into the teaching of Muratori to include wherein said selecting further comprises dynamically switching, by a user, between display modes. The modification would be obvious because one of ordinary skill in the art would be motivated to allow the user to compare data from different display modes.

Claims 27 and 52 are rejected for the same reason set forth in the rejection of Claim 2.

12. **Claims 3, 4, 9, 13, 18, 21, 24, 28, 29, 34, 38, 43, 46, 53, 54, 59, 63, 68, and 71** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Muratori** in view of **Kim**.

As per **Claim 3**, the rejection of **Claim 1** is incorporated; however, Muratori does not disclose:

- wherein the selected display mode is the function-centric display mode, and wherein said displaying comprises displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions.

Kim discloses:

- wherein the selected display mode is the function-centric display mode, and wherein said displaying comprises displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions (*see Column 9: 12-17, "FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right."*; *Column 19: 9-13, "A third preferred embodiment of the present invention includes a "thread level" that displays information concerning threads in processes in a graphical manner and allows the user to access the lower debug functions for threads displayed on the display screen."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include wherein the selected display mode is the function-centric display mode, and wherein said displaying comprises displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

As per **Claim 4**, the rejection of **Claim 3** is incorporated; and Muratori further discloses:

- wherein the corresponding thread data for a thread includes performance data of that thread as it pertains to a particular function (*see Column 5: 41-47, "Pointing (without clicking) a mouse (or other input device) to a state indicator causes information to be displayed to the user. For example, as shown in FIG. 5, pointing to point 92 on state indicator 94 displays information 96. Information 96 identifies the cycle at point 94 of thread 58c ("Cycle=4694") and the instruction of thread 58c executing at that point ("PC=193").*).

As per **Claim 9**, the rejection of **Claim 1** is incorporated; and Muratori further discloses:

- the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing a particular function of the at least one application (*see Column 4: 46-49, "GUI 52 also includes state indicators 70. State indicators 70 are horizontal (linear) bars which reflect states of execution of the threads (and the microengines) as functions of time."*; Column 5: 22-25, *"Using the state indicators, a programmer can attempt to optimize code in the threads. For example, the programmer can change code in the threads to reduce microengine idle time and thus obtain more efficient code."*).

However, Muratori does not disclose:

- wherein said selected display mode is the function-centric mode.

Kim discloses:

- wherein said selected display mode is the function-centric mode (*see Column 9: 12-17, "FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall*

program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include wherein said selected display mode is the function-centric mode. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

As per **Claim 13**, the rejection of **Claim 11** is incorporated; however, Muratori does not disclose:

- wherein said plurality of display modes further comprises a function-centric mode focusing on activities associated with a particular function.

Kim discloses:

- wherein said plurality of display modes further comprises a function-centric mode focusing on activities associated with a particular function (*see Column 9: 12-17, “FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right.”).*

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include wherein said plurality of display modes further comprises a function-centric mode focusing on

activities associated with a particular function. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

As per **Claim 18**, the rejection of **Claim 14** is incorporated; however, Muratori does not disclose:

- wherein the organizational structure is based on functional activities, and wherein said presenting comprises using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure.

Kim discloses:

- wherein the organizational structure is based on functional activities, and wherein said presenting comprises using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure (*see Column 9: 12-17, "FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right."; Column 19: 9-13, "A third preferred embodiment of the present invention includes a "thread level" that displays information concerning threads in processes in a graphical manner and allows the user to access the lower debug functions for threads displayed on the display screen."*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include

wherein the organizational structure is based on functional activities, and wherein said presenting comprises using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

As per **Claim 21**, the rejection of **Claim 14** is incorporated; however, Muratori does not disclose:

- wherein the organizational structure is based on functional activities, and wherein the presenting includes displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function.

Kim discloses:

- wherein the organizational structure is based on functional activities, and wherein the presenting includes displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function (*see Column 9: 12-17, "FIG. 6 illustrates such a call graph for the example order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right."; Column 19: 9-13, "A third preferred embodiment of the present invention includes a "thread level" that displays information concerning threads in*

processes in a graphical manner and allows the user to access the lower debug functions for threads displayed on the display screen.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include wherein the organizational structure is based on functional activities, and wherein the presenting includes displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (*see Kim – Column 3: 17-24*).

As per **Claim 24**, the rejection of **Claim 23** is incorporated; however, Muratori does not disclose:

- one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children of at least one process object of the one or more process objects and parents to at least one thread object of the one or more thread objects.

Kim discloses:

- one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children of at least one process object of the one or more process objects and parents to at least one thread object of the one or more thread objects (*see Column 9: 12-17, “FIG. 6 illustrates such a call graph for the example*

order processing program. Each of the twelve nodes 600 in the figure represents a particular function included within the overall program. The lines 602 connecting the nodes 600 indicate that the left-most function may call the function to the right.”; Column 19: 9-13, “A third preferred embodiment of the present invention includes a “thread level” that displays information concerning threads in processes in a graphical manner and allows the user to access the lower debug functions for threads displayed on the display screen.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Kim into the teaching of Muratori to include one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children of at least one process object of the one or more process objects and parents to at least one thread object of the one or more thread objects. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format (see Kim – Column 3: 17-24).

Claims 28 and 53 are rejected for the same reason set forth in the rejection of Claim 3.

Claims 29 and 54 are rejected for the same reason set forth in the rejection of Claim 4.

Claims 34 and 59 are rejected for the same reason set forth in the rejection of Claim 9.

Claims 38 and 63 are rejected for the same reason set forth in the rejection of Claim 13.

Claims 43 and 68 are rejected for the same reason set forth in the rejection of Claim 18.

Claims 46 and 71 are rejected for the same reason set forth in the rejection of Claim 21.

13. **Claims 5, 6, 19, 25, 30, 31, 44, 55, 56, and 69** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Muratori** in view of **US 6,553,564 (hereinafter “Alexander”)**.

As per **Claim 5**, the rejection of **Claim 1** is incorporated; and Muratori further discloses:

- wherein the selected display mode is the thread-centric display mode (*see Column 4: 25-28, “Referring to FIG. 3, a GUI 52 that is generated by computer instructions 48 is depicted. GUI 52 shows the operational history of computer code in threads 40 identified in display area 54.”*).

However, Muratori does not disclose:

- wherein said displaying comprises displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads.

Alexander discloses:

- wherein said displaying comprises displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads (*see Column 19: 25-40, “Additionally, in each node in tree structure 1900, a number of statistics are recorded.” and “The address represents a function entry point. The base time represents the amount of time consumed directly by this thread executing this function. The cumulative time is the amount of time consumed by this thread executing this function and all functions below it on the call stack. In the depicted example, pointers are included for each node.*

One pointer is a parent pointer, a pointer to the node's parent. Each node also contains a pointer to each child of the node.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Alexander into the teaching of Muratori to include wherein said displaying comprises displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format.

As per **Claim 6**, the rejection of **Claim 5** is incorporated; however, Muratori does not disclose:

- wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread.

Alexander discloses:

- wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread (*see Column 19: 25-40, “Additionally, in each node in tree structure 1900, a number of statistics are recorded.” and “The address represents a function entry point. The base time represents the amount of time consumed directly by this thread executing this function. The cumulative time is the amount of time consumed by this thread executing this function and all functions below it on the call stack.*

In the depicted example, pointers are included for each node. One pointer is a parent pointer, a pointer to the node's parent. Each node also contains a pointer to each child of the node.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Alexander into the teaching of Muratori to include wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format.

As per **Claim 19**, the rejection of **Claim 14** is incorporated; however, Muratori does not disclose:

- wherein the organizational structure is based on thread activities, and wherein the presenting comprises using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure.

Alexander discloses:

- wherein the organizational structure is based on thread activities, and wherein the presenting comprises using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure (*see Column 19: 25-40, “Additionally, in each node in tree structure 1900, a number of statistics are recorded.” and “The address represents a function entry point. The base time represents the amount of time consumed directly by this thread executing this function. The cumulative time is the amount of time consumed by this thread executing this function and all functions below it on the call stack. In the depicted*

example, pointers are included for each node. One pointer is a parent pointer, a pointer to the node's parent. Each node also contains a pointer to each child of the node.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Alexander into the teaching of Muratori to include wherein the organizational structure is based on thread activities, and wherein the presenting comprises using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format.

As per **Claim 25**, the rejection of **Claim 23** is incorporated; however, Muratori does not disclose:

- one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children to at least one thread object of the one or more of the thread objects, and the one or more thread objects are children to at least one process object of the one or more process objects.

Alexander discloses:

- one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children to at least one thread object of the one or more of the thread objects, and the one or more thread objects are children to at least one process object of the one or more process objects (*see Column 19: 25-40, “Additionally, in each node in tree structure 1900, a number of statistics are recorded.” and*

“The address represents a function entry point. The base time represents the amount of time consumed directly by this thread executing this function. The cumulative time is the amount of time consumed by this thread executing this function and all functions below it on the call stack. In the depicted example, pointers are included for each node. One pointer is a parent pointer, a pointer to the node's parent. Each node also contains a pointer to each child of the node.”).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Alexander into the teaching of Muratori to include one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children to at least one thread object of the one or more of the thread objects, and the one or more thread objects are children to at least one process object of the one or more process objects. The modification would be obvious because one of ordinary skill in the art would be motivated to display debugging information in a useful graphical format.

Claims 30 and 55 are rejected for the same reason set forth in the rejection of Claim 5.

Claims 31 and 56 are rejected for the same reason set forth in the rejection of Claim 6.

Claims 44 and 69 are rejected for the same reason set forth in the rejection of Claim 19.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Qing Chen whose telephone number is 571-270-1071. The Examiner can normally be reached on Monday through Thursday from 7:30 AM to 4:00 PM. The Examiner can also be reached on alternate Fridays.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Wei Zhen, can be reached on 571-272-3708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/QC/
March 20, 2008

/Wei Zhen/

Supervisory Patent Examiner, Art Unit 2191